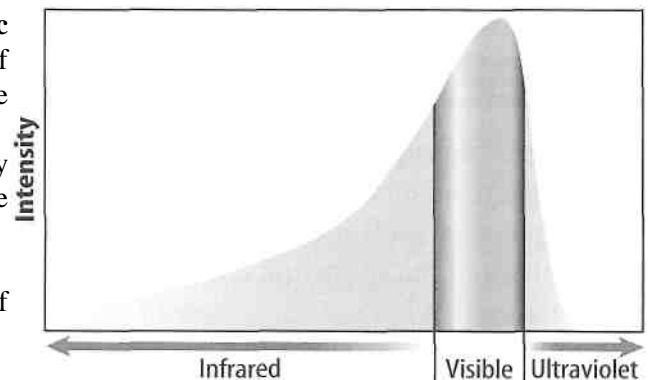


## Topics in Physics

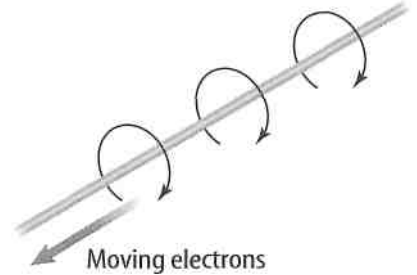
Answer the questions below to familiarize yourself with topics in physics that were not covered this year in class. You may use your textbook or the internet to find the information you need to answer the questions. Search engines such as Google, are good sources of information.

- \_\_\_\_\_ 1. Electromagnetic waves with wavelengths between about 0.7 millionths of a meter and 0.4 millionths of a meter are which of the following? (1) gamma rays (2) radio waves (3) microwaves (4) visible light
- \_\_\_\_\_ 2. Which of the following types of electromagnetic waves has the lowest frequency? (1) infrared waves (2) radio waves (3) visible light (4) gamma rays
- \_\_\_\_\_ 3. Compared to an electric charge that is not moving, a moving electric charge is surrounded by which of the following additional fields? (1) magnetic (2) electric (3) microwave (4) gravitational
- \_\_\_\_\_ 4. Which of the following color of visible light has the highest frequency? (1) green (2) yellow (3) blue (4) red
- \_\_\_\_\_ 5. Which type of electromagnetic waves are completely absorbed by Earth's atmosphere? (1) radio waves (2) gamma rays (3) infrared waves (4) visible light
- \_\_\_\_\_ 6. The frequency of a popular AM radio station is 720 kHz. What is the wavelength of the radio waves broadcast by this station? (1) 720 m (2) 417 m (3) 0.024 m (4) 720 km
- \_\_\_\_\_ 7. Which of the following types of electromagnetic waves has a frequency greater than visible light? (1) infrared waves (2) ultraviolet waves (3) radio waves (4) microwaves
- \_\_\_\_\_ 8. Which of the following types of electromagnetic waves enables your body to produce vitamin D? (1) gamma rays (2) ultraviolet waves (3) visible light (4) infrared waves
- \_\_\_\_\_ 9. If the microwaves produced in a microwave oven have a frequency of 2,450 MHz, what is the wavelength of the microwaves?
- \_\_\_\_\_ 10. A carrier wave broadcast by a radio station has a wavelength of 3.0 m. What is the frequency of the carrier wave?
- \_\_\_\_\_ 11. The graph to the right shows **Electromagnetic Waves from the Sun**. How does the intensity of ultraviolet waves emitted by the Sun change as the wave-length of the ultraviolet waves decreases? (1) The intensity increases. (2) The intensity decreases. (3) The intensity doesn't change. (4) The intensity increases, then decreases.
- \_\_\_\_\_ 12. The color of visible light waves depends on which of the following wave properties? (1) wavelength (2) direction (3) amplitude (4) speed



\_\_\_\_\_ 13. If the planet Mars is 80,000,000 km from Earth, how long will it take an electromagnetic wave to travel from Earth to Mars?

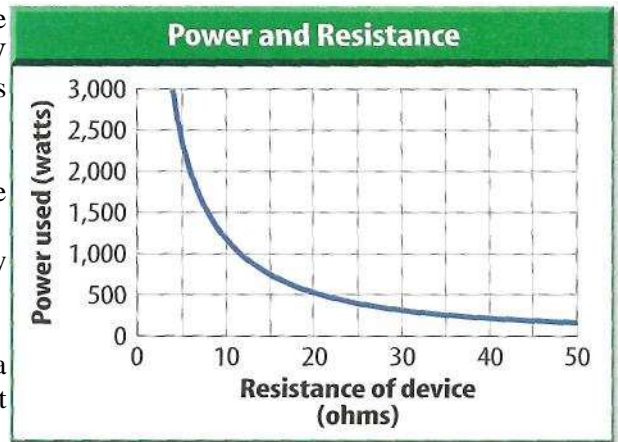
\_\_\_\_\_ 14. Which of the following is represented by the circular lines around the current-carrying wire shown to the right? (1) direction of current (2) electric and magnetic field lines (3) magnetic field lines (4) electric field lines



\_\_\_\_\_ 15. What is the force between two electrons? (1) frictional (2) attractive (3) neutral (4) repulsive

\_\_\_\_\_ 16. What property of a wire increases when it is made thinner? (1) resistance (2) voltage (3) current (4) static charge

\_\_\_\_\_ 17. Based on the graph to the right, how does the resistance change if the power decreases from 2,500 W to 500 W? (1) It increases four times. (2) It decreases four times. (3) It doubles. (4) It doesn't change.



\_\_\_\_\_ 18. How does the current in a circuit change if the voltage is doubled and the resistance remains unchanged? (1) no change (2) doubles (3) triples (4) reduced by half

\_\_\_\_\_ 19. A lightbulb with a resistance of  $30 \Omega$  is connected to a battery. If the current in the lightbulb is 0.10 A, what is the voltage of the battery?

\_\_\_\_\_ 20. Which statement does NOT describe how electric charges affect each other? (1) positive and negative charges attract (2) positive and negative charges repel (3) two positive charges repel (4) two negative charges repel

\_\_\_\_\_ 21. What property of a wire increases when it is made longer? (1) charge (2) voltage (3) resistance (4) current

**Use the table to the right to answer questions 22-24.**

\_\_\_\_\_ 22. Which appliance will use the most energy if it is run for 15 minutes? (1) microwave (2) stereo (3) computer (4) color TV

\_\_\_\_\_ 23. What is the current in the hair dryer if it is plugged into a 110-V outlet? (1) 110 A (2) 9 A (3) 130,000 A (4) 1,100 A

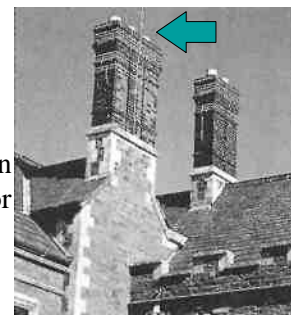
\_\_\_\_\_ 24. Suppose using 1,000 W for 1 h costs \$0.10. How much would it cost to run the color TV for 8 hours? (1) \$1.00 (2) \$1.60 (3) \$10.00 (4) \$0.16

Power Ratings of Some Appliances	
Appliance	Power (W)
Computer	350
Color TV	200
Stereo	250
Toaster	1,100
Microwave	900
Hair dryer	1,000

Use the illustration below to answer questions 25 and 26.

\_\_\_\_\_ 25. What is the device on the chimney called? (1) circuit breaker (2) fuse  
(3) lightning rod (4) circuit

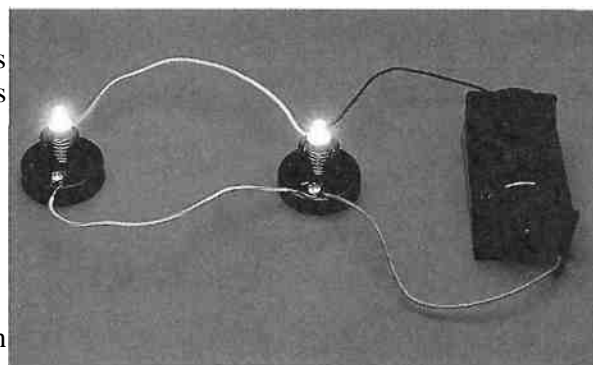
\_\_\_\_\_ 26. What is the device designed to do? (1) stop electricity from flowing (2) repel an  
electric charge (3) turn the chimney into an insulator (4) to provide grounding for  
the house



Use the illustration below to answer questions 27 and 28.

\_\_\_\_\_ 27. In the circuit shown to the right, if one lightbulb is  
unscrewed, the other bulb (1) shines brighter, (2) shines  
dimmer, (3) flickers, (4) goes out.

\_\_\_\_\_ 28. In the circuit shown to the right, the lightbulbs are in  
(1) series (2) tandem (3) parallel (4) diagonal



\_\_\_\_\_ 29. What will the north poles of two bar magnets do when  
brought together? (1) attract (2) create an electric  
current (3) repel (4) not interact

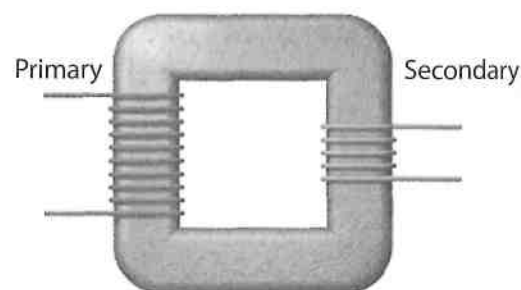
\_\_\_\_\_ 30. When a current-carrying wire is wrapped around an iron core, what can it create? (1) an aurora (2) a  
generator (3) a magnet (4) a motor

\_\_\_\_\_ 31. What prevents most charged particles from the Sun from hitting Earth? (1) the aurora (2) Earth's magnetic  
field (3) high-altitude electric fields (4) Earth's atmosphere

\_\_\_\_\_ 32. How is an electromagnet different from a permanent magnet? (1) It has north and south poles. (2) It attracts  
magnetic substances. (3) Its magnetic field can be turned off. (4) Its poles cannot be reversed.

\_\_\_\_\_ 33. What does a transformer between utility wires and your house do? (1) increases voltage (2) decreases  
voltage (3) leaves voltage the same (4) changes DC to AC

\_\_\_\_\_ 34. For this transformer pictured to the right which of the  
following describes how the output voltage compares with the  
input voltage? (1) larger (2) smaller (3) the same (4) zero  
voltage

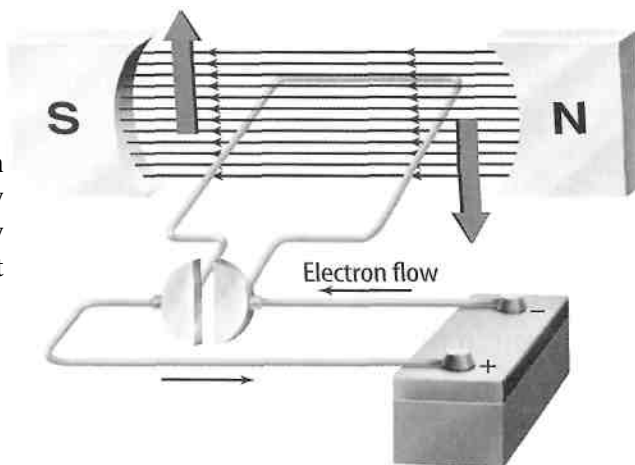


\_\_\_\_\_ 35. Which statement about the domains in a magnetized substance  
is true? (1) Their poles are in random directions. (2) Their  
poles cancel each other. (3) Their poles point in one  
direction. (4) Their orientation cannot change.

Use the figure below to answer questions 36 and 37.

\_\_\_\_\_ 36. What is the device shown? (1) electromagnet (2) electric motor (3) generator (4) transformer

\_\_\_\_\_ 37. Which of the following best describes the function of this device? (1) It transforms electrical energy into kinetic energy. (2) It transforms kinetic energy into electrical energy. (3) It increases voltage. (4) It produces an alternating current.

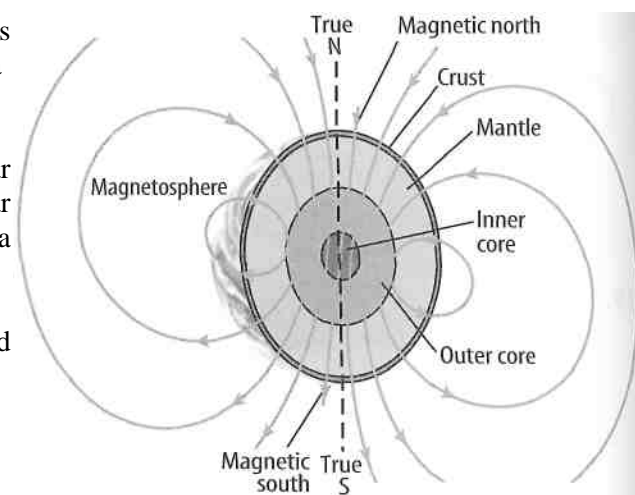


Use the figure below to answer questions 38-40.

\_\_\_\_\_ 38. What is the region of space affected by Earth's magnetic field called? (1) declination (2) aurora (3) magnetosphere (4) outer core

\_\_\_\_\_ 39. What is the shape of Earth's magnetic field similar to? (1) that of a horseshoe magnet (2) that of a bar magnet (3) that of a disk magnet (4) that of a superconductor

\_\_\_\_\_ 40. In which of Earth's layers is Earth's magnetic field generated? (1) crust (2) outer core (3) mantle (4) inner core



\_\_\_\_\_ 41. The table to the right shows the power used by several appliances when they are turned off. Calculate the cost of the electrical energy used by each appliance in a month if the cost of electrical energy is \$0.08/kWh, and each appliance is in standby mode for 600 h each month.

Average Standby Power Used	
Appliance	Power (W)
Computer	7.0
VCR	6.0
TV	5.0

Use the table below to answer questions 42 and 43.

\_\_\_\_\_ 42. Which of the above substances will float in water? (1) ice, only (2) lead and sugar (3) ice and sugar (4) ice and balsa wood

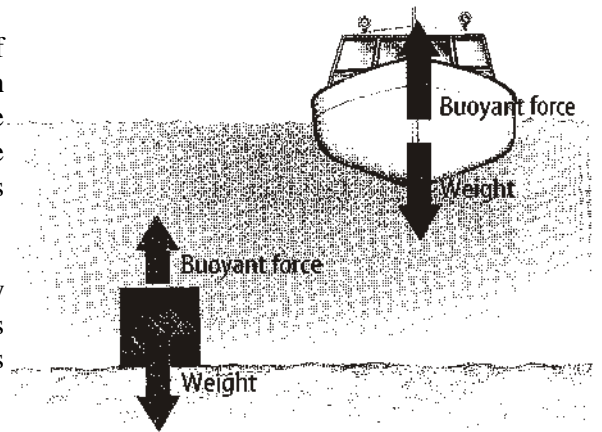
\_\_\_\_\_ 43. Find the volume of ice if it has a mass of 30.0 g. (1) 27.6 cm<sup>3</sup> (2) 29.08 cm<sup>3</sup> (3) 30.92 cm<sup>3</sup> (4) 32.61 cm<sup>3</sup>

Substance	Density (g/cm <sup>3</sup> )
Ice	0.92
Lead	11.34
Balsa wood	0.12
Sugar	1.59

Use the illustration below to answer questions 44 and 45.

\_\_\_\_\_ 44. Assume the boat and cube have the same mass. Which of these is correct? (1) The boat displaces less water than the cube. (2) The densities of the boat and cube are equal. (3) The density of the boat is greater than the density of the water. (4) The density of the boat is less than the density of the cube.

\_\_\_\_\_ 45. Which of the following would make the cube more likely to float? (1) increasing its volume (2) increasing its density (3) increasing its weight (4) decreasing its volume



\_\_\_\_\_ 46. The small piston of a hydraulic lift has an area of 0.02 m<sup>2</sup>. If a force of 250 N is applied to the small piston, find the force on the large piston if it has an area of 0.08 m<sup>2</sup>. (1) 25 N (2) 62.5 N (3) 1000 N (4) 251 N

\_\_\_\_\_ 47. Which of the three fish pictured below has the lowest water pressure exerted on it? (1) A (2) B (3) C (4) They all have the same pressure on them.

\_\_\_\_\_ 48. Why do houses often lose a roof during a high wind? (1) The wind pushes the roof off. (2) The wind reduces the pressure above the roof. (3) The wind gets under the roof. (4) The wind creates an upward force.

\_\_\_\_\_ 49. The pressure exerted by a fluid on a surface is always in which direction? (1) perpendicular to the surface (2) parallel to the surface (3) downward (4) upward

\_\_\_\_\_ 50. Each of the graduated cylinders pictured to the right contains the same amount of water. Which of the following statements is true? (1) The pressure is greatest at the bottom of cylinder A. (2) The pressure is greatest at the bottom of cylinder C. (3) The pressure is equal at the bottom of all three cylinders. (4) The pressure at the bottom of cylinder B is equal to the pressure at the top of cylinder C.

